



Announcements

The next JSWAG Technical Interchange Meeting is scheduled for August 26-28, 2014 at Wright Patterson AFB, OH. The JFOWG will meet August 28, 2014. Please contact a committee chair if interested in attending or send an email to jswag@navy.mil.

Training Resources

- Aircraft Wiring Systems Awareness DVD- Defense Imagery PIN #806881.
- Fiber Optic Awareness DVD- Defense Imagery PIN #806707.
- Joint Services Wiring Manual Maintenance Techniques DVD- Defense Imagery PIN #806994.
- MIL-HDBK-522- Guidelines for Inspection of Aircraft Wiring Interconnect Systems- <https://assist.daps.dla.mil>.
- MIL-HDBK-525- Electrical Wiring Interconnect System (EWIS) Integrity- <https://assist.daps.dla.mil>.

Newsletter Contact

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High Speed Data Connector

The NAVAIR Wiring Systems Team (AIR-4.4.5.3) in cooperation with various industry representatives and the SAE (Society of Automotive Engineers) has been working to resolve an issue with standardization of High Speed Data Connectors and Cables. High Speed Data transmission as discussed in this newsletter is the transfer of high speed digital data across twisted pairs of wires and connectors. One of the more common protocols used is Ethernet which is a family of computer networking technologies for local area networks (LANs) used commercially today in homes and offices around the world. The data transmission speed has a bandwidth of 100MHz to 500MHz and can transmit digital data at 10 megabits to 10 gigabits per second. In your home or office you often hear the high speed data connector referred to as a RJ45 connector and the cable referred to as CAT 5, 5e, 6, 6a or 7. Unfortunately, the RJ45 connector, CAT 5 through 7 twisted pair cable material and shielding are not rated for aircraft operating environment and installation guidance is not available for aircraft installation.

This NAVAIR effort is a threefold task working to develop: (1) a military specification with detail specification sheets for the High Speed Data connector; (2) a SAE AS6070 standard with detail specification sheets for High Speed Data cables; and (3) design and installation guidance for aircraft installations. The challenge of developing these standards is the coordination required with private industry and three committees within SAE.

High Speed Data Connector military specification. The NAVAIR led team has been working to develop a military specification for High Speed Data connectors. As mentioned above, the commercially available RJ45 connector cannot meet the demanding aircraft temperature, vibration or electromagnetic interference (EMI) operating environments. NAVAIR first started working with SAE to develop an aerospace standard for this connector, but quickly ran into issues related to the patents related to the high speed data connector designs. A military detail specification was decided upon for the connector. The goal is to detail a connector with the following characteristics: connector shell defined by MIL-DTL-38999 Series III; compatible with High Speed Data cable defined by AS6070; compatible with IEEE 802 and 1394 protocols; use common SAE AS39029 contacts, M22520/2 crimp tool and positioners, and use common

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MIL-I-81969/8 or /14 installation/removal tools. The basic military specification has been drafted. Three detail specification sheets are in work and define a square flange receptacle, plug and threaded jam nut receptacle. NAVAIR anticipates forwarding these draft specifications to NAVAIR, Lakehurst, (standardization office) for review, final formatting and Industry/Government coordination by the end of July 2014. The current goal is to have these initial specifications published by the end of FY14.

SAE AS6070 High Speed Data Cable standard. NAVAIR has also been working with the SAE AE-8D, Wire and Cable Committee, to develop AS6070 for High Speed Data cables. Four detail specification sheets have been developed to date with the following salient features: Protocols – Ethernet 10/100 Base T, 1000 Base T, and IEEE-1394B; Temperature ratings - 150°C and 200°C; Wire configurations – Quad, two and four twisted pair, Impedance – 100 ohm and 110 ohm; Marking identification – similar to the marking requirement of AS22759 aircraft wire and NEMA-WC-27500 cable. These standards have gone through several 28 day SAE Committee ballots to date. During the April SAE AE8D committee meeting the last remaining technical details were agreed upon. NAVAIR anticipated that the basic standard and four detail specification sheets will be submitted for the 28 day SAE AE-8D Committee ballot by the end of June 2014.

Ethernet design and installation guidance for aircraft. NAVAIR requested in April 2014 that a new Task Group be established under the SAE AS-1A, Avionics Networks Committee, to define requirements for the use of Ethernet as a data bus network in military and aerospace vehicles. It is anticipated that this new standard will be patterned after AS5643 which defines the use of the IEEE-1394b in military and aerospace vehicles. This new standard for Ethernet will encompass the data bus cable and its interface electronics for a system utilizing copper medium over extended lengths. This document will contain extensions/restrictions to “off-the-shelf” Ethernet standards, and assumes that the reader already has a working knowledge of Ethernet. This standard will not identify specific environmental requirements (electromagnetic compatibility, temperature, vibration, etc.); such requirements will be vehicle-specific. However, the hardware requirements and examples will address many of the environmental conditions that military and aerospace vehicles may experience. This effort has only just started.

As Ethernet protocol is gaining increased acceptance and requires installation on various military applications, it is imperative to standardize on its EWIS configuration. This ensures minimum performance requirements and long term supportability.

2013 Lu Roberts Award Recipient



Oliviu Muja congratulates Daniel Capps on receiving the Lu Roberts Award

The 2013 Lu Roberts Award was presented to Daniel Capps at the Spring 2014 Technical Interchange Meeting in Lexington Park, MD. Capps, an Aircraft Wiring and Equipment Installation Specialist, supports NAVAIR Propulsion and Power Engineering Department (AIR-4.4) at the Fleet Readiness Center-East in Cherry Point, NC. Capps was awarded the Lu Roberts Award for providing assistance to the MV-22 community with their Zero Time Harness issues by preparing the Engineering Investigation to cover all aspects of the testing, inspection and repair. His efforts have been instrumental for various aircraft and are appreciated by all personnel supporting and maintaining aerospace wiring systems.

To read more about the Lu Roberts Award or see previous winners, please visit www.navair.navy.mil/jswag/luroberts.htm. 